LÖNNE
DRIVE TECHNOLOGY

• 20130630 •

iDrive

MULTIFUNCTION AC DRIVE

BASIC USER MANUAL

English

Issued on 06/30/13
R. 05

• This manual is integrant and essential to the product. Carefully read the instructions contained herein as they provide important hints for use and maintenance safety.
• This device is to be used only for the purposes it has been designed for. Other uses should be considered improper and dangerous. The manufacturer is not responsible for possible damages caused by improper, erroneous and irrational uses.
• Lönne Scandinavia AS is responsible for the device in its original setting.
• Any changes to the structure or operating cycle of the device must be performed or authorized by Lönne Scandinavia AS
• Lönne Scandinavia AS assumes no responsibility for the consequences resulting by the use of non-original spare-parts.
• Lönne Scandinavia AS reserves the right to make any technical changes to this manual and to the device without prior notice. If printing errors or similar are detected, the corrections will be included in the new releases of the manual.
• The information contained herein is the property of Lönne Scandinavia AS, and cannot be reproduced. Lönne Scandinavia AS enforces its rights on the drawings and catalogues according to the law.

LÖNNE
DRIVE TECHNOLOGY

Lönne Scandinavia AS
Liamyrane 12 – N-5132 Nyborg, Norway
Tel. +47 55 39 10 00 – Fax +47 55 39 11 00
www.lonne.com info@lonne.com

0.STARTUP

NOTE This manual covers basic installations of the iiDrive. For more details, please refer to the standard iDrive's **Installation Instructions** manual.

NOTE iDrive is factory set with the IFD control algorithm (V/f) allowing performing the first startup of the equipment. The default functions are given in this section, particularly in step **5): Start up**.

1) Inspection:	Check if the size of the iDrive is greater than or equal to the size of the connected motor according to the drive nameplate. See the Delivery Check section.
2) Installation and wiring:	The IP rating of the iDrive is given in the Installing the Equipment section. Ensure that sufficient ventilation is provided to the drive. More details are given in the standard iDrive **Installation Instructions** manual.
3) Power on:	Power on the drive; check if the keypad turns on.
4) Parameter setting:	For an easier startup of the iDrive, you can activate the Start-Up Menu. The Start-Up Menu is a wizard allowing programming the main parameters for the connected motor. The Start-Up Menu is displayed when the iDrive is first started. The Start-Up Menu can be reactivated at any time. To do so, set **P265** in "Start Up" mode: **[IDP] iDrive** **START-UP MENU** **Press ENTER** **to start** Press Enter to enter the wizard. Before entering the control parameters, you are asked to choose a dialogue language: **P263 Language** **→@@@@@@@@@@@@@@@@** Then you are asked to choose the display mode of the Start Up Menu: **When does the** **Start-Up Menu** **activate?** **→@@@@@@@@@@@@@@@@** Choose one of the following: **1 : EVERY START-UP** **2 : ONLY NOW** **3 : NEXT START-UP** **4 : NEVER**

If you select “EVERY START-UP”, the wizard appears whenever the iDrive is powered on;
if you select “ONLY NOW”, you can scroll through the menu and the wizard is disabled as soon as you quit the menu;
if you select “NEXT START-UP”, the menu is displayed only the next time the iDrive is started up;
if you select “NEVER”, the Start-Up menu is disabled.

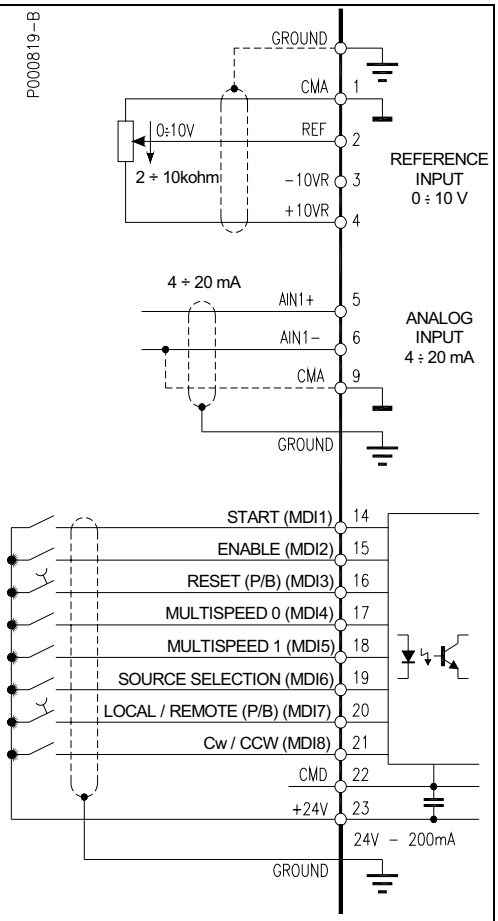
Parameters included in the Start-Up menu:

Parameter	Description	Visibility
C008	Rated mains voltage	
C010	Type of control algorithm	
C012	Speed feedback from encoder	[only if FOC is active]
C013	Type of V/f pattern	[only if IFD is active]
C015	Rated motor frequency	
C016	Rated motor rpm	
C017	Rated motor power	
C018	Rated motor current	
C019	Rated motor voltage	
C021	No-load current of the motor	[only if FOC is active]
C028	Min. motor speed	
C029	Max. motor speed	
C034	Voltage preboost	[only if IFD is active]
P009	Acceleration ramp time	
P010	Deceleration ramp time	
C043	Current limit while accelerating	[only if IFD is active]
C044	Current limit at constant rpm	[only if IFD is active]
C045	Current limit while decelerating	[only if IFD is active]
C048	Torque limit	[only if VTC/FOC are active]
C189	Encoder operating mode	[only if FOC is active]
C190	Encoder A pls/rev	[only if FOC is active]
C191	Encoder B pls/rev	[only if FOC is active]
I073	Autotuning selection	[only if VTC/FOC are active]
I074	Motor tuning selection	[only if VTC/FOC are active]
C265	Motor thermal protection	
C267	Motor thermal time constant	[only if protection is active]

After setting the last parameter and moving the cursor forward, the following page will appear:

```
Press UP ARROW
to quit
DOWN ARROW
to continue
```

Press ▲ to quit the Start-up menu. The default page of the system will be displayed.

5) Startup:	**Terminal Control:** i) Activate the **ENABLE** input (terminal 15). ii) Activate the **START** input (terminal 14). iii) Send speed reference to REF: 0-10V (terminals 1, 2 & 3) or Send speed reference to AIN1: 4-20mA (terminals 5 & 6). This requires Source Selection input on MDI6 to be active (terminal 19). The RUN LED and REF LED will be lit and the motor will start. Make sure that the motor is rotating in the correct direction. If not, operate on terminal MDI5 (terminal 18) (CW/CCW) or open the **ENABLE** and **START** terminals. Shut off the drive, wait at least 20 minutes and swap two of the motor phases. **Keypad Control:** i) Activate the **ENABLE** input (terminal 15). ii) Press the **LOCAL/REMOTE** button on the keypad. iii) The L-CMD and L-REF LEDs will be lit. iv) Press the **START** button. v) Hold the Up button to increase the speed reference. The RUN LED and REF LED will come on and the motor will start. Make sure that the motor is rotating in the correct direction. If not, press the **FWD/REV** button or press **STOP**. Shut off the drive, wait at least 20 minutes and swap two of the motor phases. 
6) Possible failures:	If no failure occurred, go to the next step. Otherwise, check the drive connections paying particular attention to supply voltages, DC link and input reference. Also check if alarm messages are displayed. In the MEASURES MENU, check values in the Fault List for the reference speed (**M000**), the supply voltage to the drive (**M030**), the DC link voltage (**M029**), and the condition of control terminals (**M033**). Check to see if these readouts match with the measured values.
7) Additional parameter alterations:	In **BASIC** user level, adjustments can be made to a limited number of parameters. The iDrive has a wide range of functions; to access these function, set the user level to **ADVANCED** or **ENGINEERING** by adjusting parameter **P001** accordingly (refer to iDrive iDrive's Programming Instructions manual).
8) Reset:	If an alarm trips, find the cause responsible for the alarm and reset the equipment. Enable MDI3 (terminal 16) or press the **RESET** key on the display/keypad.

1.TABLE OF CONTENTS

1.1. Chapters

0. STARTUP 2
1. TABLE OF CONTENTS 5
1.1. Chapters 5
1.2. Figures 5
1.3. Tables 5
1.4. How to Use this Manual 6
1.4.1. Overview 6
2. HARDWARE DESCRIPTION AND INSTALLATION 7
2.1. Caution Statements 7
2.2. Delivery Check 9
2.2.1. Nameplate 10
2.3. Installing the Equipment 10
2.3.1. Environmental Requirements for the Equipment Installation, Storage and Transport 11
2.3.2. Power Terminals / Bars 12
2.3.3. Connection Bars for S60 Inverters 15
2.3.4. Cross-sections of the Power Cables and Sizes of the Safety Devices 16
2.3.4.1. 2T Voltage Class 16
2.3.4.2. 4T Voltage Class 17
2.3.4.1. 5T and 6T Voltage Classes 18
2.3.5. Inverter and Motor Earth Connection 19
3. USING THE DISPLAY/KEYPAD 20
3.1. Overview 20
3.2. Menu Tree 20
3.3. Navigation 21
3.4. Function Keys 22
3.5. Indicator LEDs in the Display/Keypad 23
4. WIRING 24
4.1. Wiring Diagram 24
5. ALARMS AND WARNINGS 26
5.1. What Happens when a Protective Device Trips 26
5.2. What To Do when an Alarm Trips 27
5.3. Alarm Code List 28
5.4. Warnings 32
5.5. State List 34

1.2. Figures

Figure 1: Nameplate of the iDrive 10
Figure 2: Connection bars in S41-S42-S51-S52 14
Figure 3: S60 Connection bars 15
Figure 4: Menu Tree 20
Figure 6: Wiring Diagram. 24

1.3. Tables

Table 1: Alarm Code List. 31
Table 2: Warning list. 33
Table 3: State List. 34

1.4. How to Use this Manual

1.4.1. OVERVIEW

This User Manual (Basic User Manual) provides information required to setup and monitor the drives of the iDrive series manufactured by Elettronica Santerno when used in the Basic mode.

The section concerning the hardware description and installation covers basic wiring only. Refer to the **Installation Instructions** manual to install additional options and/or to configure analogue/digital inputs and outputs.

The iDrive is delivered in Basic mode, which provides a cut down parameter set and preset I/O settings. If additional adjustment is required, this may be achieved by setting the drive to Advanced or Engineering using parameter **P001** (see the PASSWORD AND USER LEVEL MENU in the **Programming Instructions** manual.

Setup/monitoring may be obtained using one or both of the following options:

1) Display/keypad unit;
2) Serial link through RS485 standard port or ES822 optional board.

For the instructions on how to use and remote the display/keypad unit, please refer to the **Installation Instructions** manual.

Any information sent to/from the drive through the display/keypad unit may be obtained also via serial link using the RemoteDrive software application provided by Lönne Scandinavia AS.

The RemoteDrive allows the following functions: image acquisition, keypad simulation, oscilloscope functions and multifunction tester, table compiler including operation data log, parameter setup and data reception-transmission-storage from and to a calculator, scan function for the automatic detection of the connected drives (up to 247 drives may be connected).

When used in Advanced or Engineering mode, many additional functions are available. These include the following:

- Customisation of Keypad navigation.
- Customisation of standard monitoring values.
- Selection of up to 4 acceleration and deceleration ramps.
- Customisation and scaling of analog input signals.
- Selection of up to 15 preset speeds.
- Configuration of 3 prohibit speeds.
- Utilisation of a speed variation function.
- Tuning of VTC and FOC algorithms.
- Customisation of analog output signals.
- Allocation of internal timer functions to digital I/O.
- PID activation and tuning.
- Configuration of Digital output comparator and logic functions.
- Master/slave operation with torque control.
- Adjustment of current and torque limits.
- Customisation of digital inputs.
- Setting of control source for start and speed commands.
- Configuration of a connected encoder.
- DC braking.
- Dynamic braking.
- Speed Search function.
- Autoreset.
- Motor thermal modelling and thermistor allocation.
- Crane control functions.
- Serial and Fieldbus communication.

If any of the above functions is required, use parameter **P001** to access the Advanced or Engineering settings.

2. HARDWARE DESCRIPTION AND INSTALLATION

2.1. Caution Statements

SYMBOLS:

	DANGER	Indicates operating procedures that, if not correctly performed, may cause serious injury or death due to electrical shock.
	CAUTION	Indicates operating procedures that, if not carried out, may cause serious equipment failure.
	NOTE	Indicates important hints concerning the equipment operation.

SAFETY STATEMENTS TO FOLLOW WHEN INSTALLING AND OPERATING THE EQUIPMENT:

NOTE

1. Always read this instruction manual before starting the equipment.
2. The ground connection of the motor casing should follow a separate path to avoid possible interferences.

DANGER

1. ALWAYS PROVIDE PROPER GROUNDING OF THE MOTOR CASING AND THE DRIVE FRAME.
2. If a differential relay against electric shocks is intended to be used, this must be a “B-type” differential relay.
3. The drive may generate an output frequency up to 1000 Hz; this may cause a motor rotation speed up to 20 (twenty) times the rated motor speed (for 50Hz motors): never use the motor at higher speed than the max. allowable speed stated on the motor nameplate.
4. ELECTRICAL SHOCK HAZARD – Never touch the drive electrical parts when the drive is on; always wait at least 20 minutes after switching off the drive before operating on the drive.
5. Never perform any operation on the motor when the drive is on.
6. Do not perform electrical connections on the motor or the drive if the drive is on. Electrical shock hazard exists on output terminals (U,V,W) and resistive braking module terminals (+, –, B) even when the drive is disabled. Wait at least 20 minutes after switching off the drive before operating on the electrical connection of the motor or the drive.
7. MECHANICAL MOTION – The drive determines mechanical motion. It is the operator's responsibility to ensure that this does not give rise to any dangerous situation.
8. EXPLOSION AND FIRE – Explosion and fire hazard exists if the equipment is installed in presence of flammable fumes. Do not install the drive in places exposed to explosion and fire hazard, even if the motor is installed there.

1. Do not connect supply voltages exceeding the equipment rated voltage to avoid damaging the internal circuits.
2. If the drive is installed in environments exposed to flammable and/or explosive substances (AD zones according to IEC 64-2 standards), please refer to IEC 64-2, EN 60079-10 and related standards.
3. Do not connect the equipment power supply to the output terminals (U,V,W), to the resistive braking module terminals (+, -, B) or to the control terminals. The equipment power supply must be connected only to terminals R,S,T.
4. Do not short-circuit terminals (+) and (-) and terminals (+) and (B); do not connect any braking resistors with lower ratings than the required ratings given in the **Installation Instructions** manual.
5. Do not start or stop the connected motor using a contactor over the inverter power supply.
6. Do not install any contactor between the inverter and the motor. Do not connect any power factor correction capacitor to the motor.
7. Operate the inverter only if a proper grounding is provided.
8. If an alarm trips, a comprehensive review of the ALARMS AND WARNINGS section is recommended; restart the equipment only after removing the cause responsible for the alarm trip.

CAUTION

9. Do not perform any insulation test between the power terminals or the control terminals.
10. Make sure that the fastening screws of the control terminal board and the power terminal board are properly tightened.
11. Do not connect single-phase motors.
12. Always use a motor thermal protection (use the inverter motor thermal model or a thermoswitch installed in the motor).
13. Respect the environmental requirements for the equipment installation.
14. The bearing surface of the drive must be capable of withstanding high temperatures (up to 90°C).
15. The drive electronic boards contain components which may be affected by electrostatic discharges. Do not touch them unless it is strictly necessary. Always be very careful so as to prevent any damage caused by electrostatic discharges.

ATTENTION
Static Sensitive Devices.
Handle Only at Static Safe Work Stations.
ATTENTION
Circuits sensibles à l´électricité statique.
Manipulation uniquement autorisée sur un poste de travail protégé.
ACHTUNG
Elektrostatisch gefährdete Bauelemente.
Handhabung daher nur an geschützten Arbeitsplätzen erlaubt.

2.2. Delivery Check

Make sure that the equipment is not damaged and that it complies with the equipment you ordered by referring to the nameplate located on the drive front part. The drive nameplate is described below. If the equipment is damaged, contact the supplier or the insurance company concerned. If the equipment does not comply with the one you ordered, please contact the supplier as soon as possible.
If the equipment is stored before being started, make sure that the ambient conditions do not exceed the ratings mentioned in the Installing the Equipment section. The equipment guarantee covers any manufacturing defect. The manufacturer has no responsibility for possible damages occurred when shipping or unpacking the drive. The manufacturer is not responsible for possible damages or faults caused by improper and irrational uses; wrong installation; improper conditions of temperature, humidity, or the use of corrosive substances. The manufacturer is not responsible for possible faults due to the drive operation at values exceeding the drive ratings and is not responsible for consequential and accidental damages. The equipment is covered by a 3-year guarantee starting from the date of delivery.

Product ID:

6T	S14	7	4	IP54	EMCIT	B
1	2	3	4	5	6	7

1	Supply Voltage 2 = Power supply 200÷240VAC; 280÷340VDC 4 = Power supply 380÷500VAC; 530÷705VDC 5 = Power supply 500÷600VAC, 705÷845VDC 6 = Power supply 600÷690VAC; 845÷970VDC
2	Size
3	Nominal current (A)
4	Power in Heavy rating (kw)
5	Degree of protection 0 = IP00 (Sizes greater than S32) 2 = IP20 (up to Size S32) 5 = IP54 (possible up to Size S32)
6	Type of integrated EMC filter EMC = A2 filter for TN grid EMCIT = A2 filter for IT grid
7	Braking module X = no internal braking chopper B = built-in braking chopper

2.2.1. NAMEPLATE

Typical nameplate for 2T iDrive:

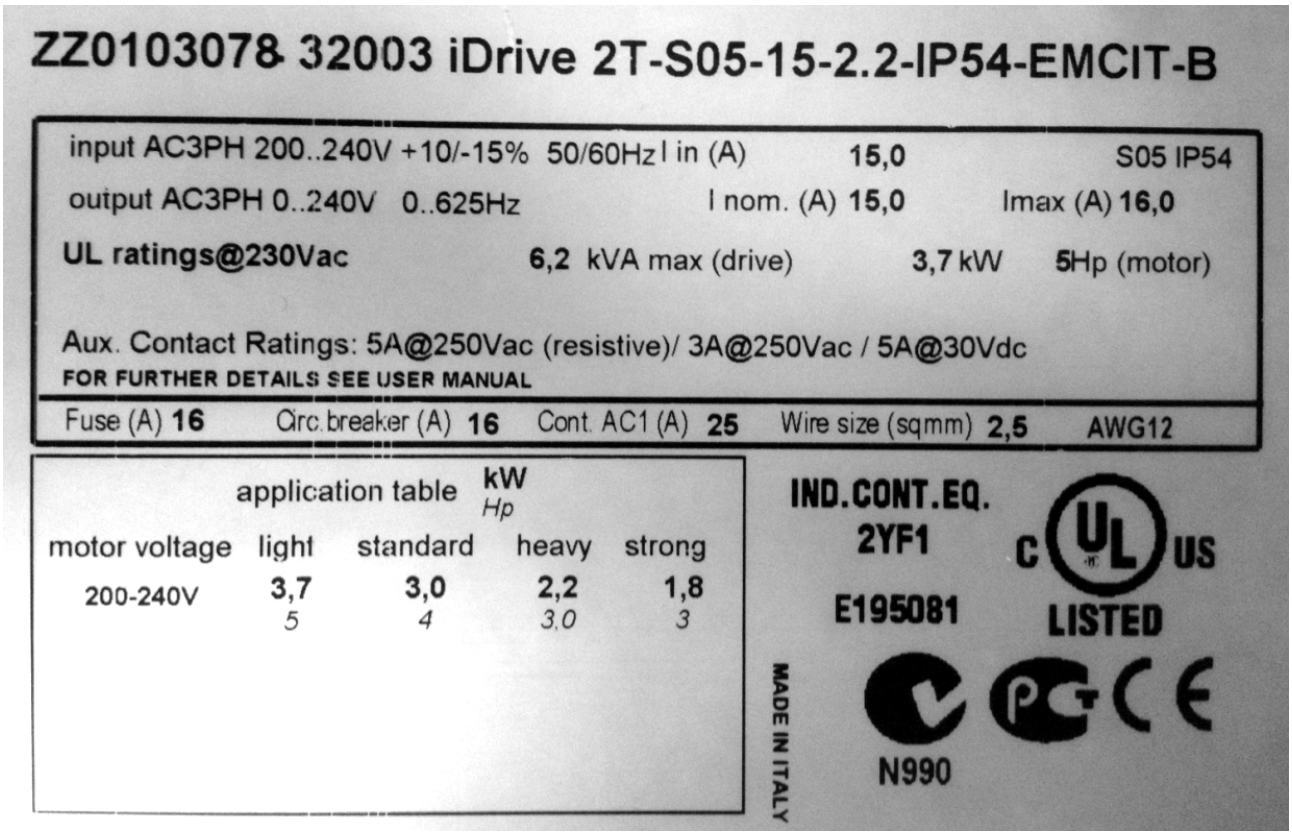

ZZ0103078 32003 iDrive 2T-S05-15-2.2-IP54-EMCIT-B
input AC3PH 200..240V +10/-15% 50/60Hz I in (A) 15,0 S05 IP54
output AC3PH 0..240V 0..625Hz I nom. (A) 15,0 Imax (A) 16,0
UL ratings@230Vac 6,2 kVA max (drive) 3,7 kW 5Hp (motor)
Aux. Contact Ratings: 5A@250Vac (resistive)/ 3A@250Vac / 5A@30Vdc
FOR FURTHER DETAILS SEE USER MANUAL
Fuse (A) 16 Circ.breaker (A) 16 Cont. AC1 (A) 25 Wire size (sqmm) 2,5 AWG12
application table kW Hp
motor voltage light standard heavy strong
200-240V 3,7 5 3,0 4 2,2 3,0 1,8 3
IND.CONT.EQ.
2YF1
E195081
LISTED
N990
MADE IN ITALY

Figure 1: Nameplate of the iDrive.

2.3. Installing the Equipment

The inverters of the iDrive series are Open Type Equipment – degree of protection IP00 and IP20 – that can be installed inside another enclosure. Only models with degree of protection IP54 may be wall-mounted.
The drives must be installed vertically.
The ambient conditions, the instructions for the mechanical assembly and the electrical connections of the drives are detailed in the sections below.

CAUTION Install the drive in an upright position.
Do not install the drive horizontally or upside-down.

CAUTION Do not mount any heat-sensitive components on top of the drive to prevent them from damaging due to hot exhaust air.

CAUTION The drive rear wall may reach high temperatures; make sure that the drive bearing surface is not heat-sensitive.

2.3.1. ENVIRONMENTAL REQUIREMENTS FOR THE EQUIPMENT INSTALLATION, STORAGE AND TRANSPORT

Any electronic board installed in the inverters manufactured by Elettronica Santerno is tropicalised. This enhances electrical insulation between the tracks having different voltage ratings and ensures longer life of the components. It is however recommended that the prescriptions below shall be strictly followed:

Maximum surrounding air temperature	–10 to 40 °C with no derating from 40°C to 50°C with no derating or with 2% derating of the rated current for every degree beyond 40°C based on the inverter model and the application category (see OPERATING TEMPERATURES BASED ON APPLICATION CLASSES in the **Installation Instructions** manual).
Ambient temperatures for storage and transport	–25 °C to 70 °C
Installation environment	Pollution degree 2 or better. Do not install in direct sunlight and in places exposed to conductive dust, corrosive gases, vibrations, water sprinkling or dripping (except for IP54 models); do not install in salty environments.
Altitude	Max. altitude for installation 2000 m a.s.l. For installation above 2000 m and up to 4000 m please contact Lönne Scandinavia AS. Above 1000 m, derate the rated current by 1% every 100 m.
Operating ambient humidity	From 5% to 95%, from 1g/m^3 to 29g/m^3, non condensing and non freezing (class 3k3 according to EN50178).
Storage ambient humidity	From 5% to 95%, from 1g/m^3 to 29g/m^3, non condensing and non freezing (class 1k3 according to EN50178)
Ambient humidity during transport	Max. 95%, up to 60g/m^3; condensation may appear when the equipment is not running (class 2k3 according to EN50178).
Storage and operating atmospheric pressure	From 86 to 106 kPa (classes 3k3 and 1k4 according to EN50178).
Atmospheric pressure during transport	From 70 to 106 kPa (class 2k3 according to EN50178).

CAUTION As ambient conditions strongly affect the drive life, do not install the equipment in places that do not have the above-mentioned ambient conditions.

CAUTION Always transport the equipment within its original package.

2.3.2. POWER TERMINALS / BARS

DESCRIPTION	
41/R – 42/S – 43/T	Inputs for three-phase supply (the phase sequence is not important)
44/U – 45/V – 46/W	Three-phase motor outputs
47/+	Link to the DC voltage positive pole. It can be used for -DC voltage supply; - DC reactor; - the external braking resistor and the external braking unit (for the drive models which are NOT provided with terminal **50/+** dedicated to the external braking resistor) - the external braking unit.
47/D	When fitted, link to the positive pole of the continuous AC rectified voltage. It can be used for the DC reactor—if no DC reactor is used, terminal 47/D must be short-circuited to terminal **47/+** using a cable/bar having the same cross-section as the cables used for power supply; factory setting).
48/B	When available, it can be used to connect the IGBT brake for braking resistors.
49/–	Link to the negative pole of the DC voltage. It can be used for DC power supply and the external braking unit (for the drive models which are NOT provided with terminal **52/-** dedicated to the external braking unit).
50/+	When available, it can be used to connect the positive pole of the DC voltage to be used for the external braking resistor only.

S05 (4T)-S15-S20 Terminal board:

41/**R**	42/**S**	43/**T**	44/**U**	45/**V**	46/**W**	47/**+**	48/**B**	49/**–**

S05 (2T) Terminal board:

41/**R**	42/**S**	43/**T**	44/**U**	45/**V**	46/**W**	47/**+**	47/**D**	48/**B**	49/**–**

CAUTION Connection bars **47D** and **47+** are short-circuited as a factory setting. The DC choke, if any, shall be linked between bars **47D** and **47+** after removing the short-circuit.

CAUTION If DC supply is required and if an external braking resistor is to be installed, remove the short-circuit between **47/D** and **47/+** and use terminal **47/+**.

CAUTION Use terminals **47/+** and **48/B** if an external braking resistor is to be installed.

S12 Terminal board (2T-4T)-S14:

41/**R**	42/**S**	43/**T**	47/**+**	47/**D**	48/**B**	49/**–**	44/**U**	45/**V**	46/**W**

CAUTION Connection bars **47/D** and **47/+** are short-circuited as a factory setting. The DC choke, if any, shall be linked between bars **47/D** and **47/+** after removing the short-circuit.

CAUTION If DC supply is required and if an external braking resistor is to be installed, remove the short-circuit between **47/D** and **47/+** and use terminal **47/+**.

CAUTION Use terminals **47/+** and **48/B** if an external braking resistor is to be installed.

S12 Terminal board (5T):

41/**R**	42/**S**	43/**T**	47/**+**	47/**D**	49/**–**	44/**U**	45/**V**	46/**W**

S22-32 Terminal board:

48/**B**	50/**+**	47/**+**	47/**D**	49/**–**	41/**R**	42/**S**	43/**T**	44/**U**	45/**V**	46/W

CAUTION Connection bars **47/D** and **47/+** are short-circuited as a factory setting. The DC choke, if any, shall be linked between bars **47/D** and **47/+** after removing the short-circuit.

CAUTION If DC supply is required and if an external braking resistor is to be installed, remove the short-circuit between **47/D** and **47/+** and use terminal **47/+**.

NOTE Connect the braking resistor to terminals **50/+** and **48/B**.
Avoid using terminals **50/+** and **48/B** for applying DC power supply.

S30 Terminal board:

41/**R**	42/**S**	43/**T**	44/**U**	45/**V**	46/**W**	47/**+**	49/**–**	48/**B**	50/**+**

NOTE Connect the braking resistor to terminals **50/+** and **48/B**.
Avoid using terminals **50/+** and **48/B** for applying DC power supply.

Connection bars for S41-S42-S51-S52:

CAUTION Connection bars **47/D** and **47/+** are short-circuited as a factory setting. The DC choke, if any, shall be linked between bars **47/D** and **47/+** after removing the short-circuit.

CAUTION Please contact Lönne Scandinavia AS if DC supply is to be applied to iDrive S41, S42, S51, S52.

NOTE Use terminals **47/+** and **49/–** if the external braking unit is to be installed.

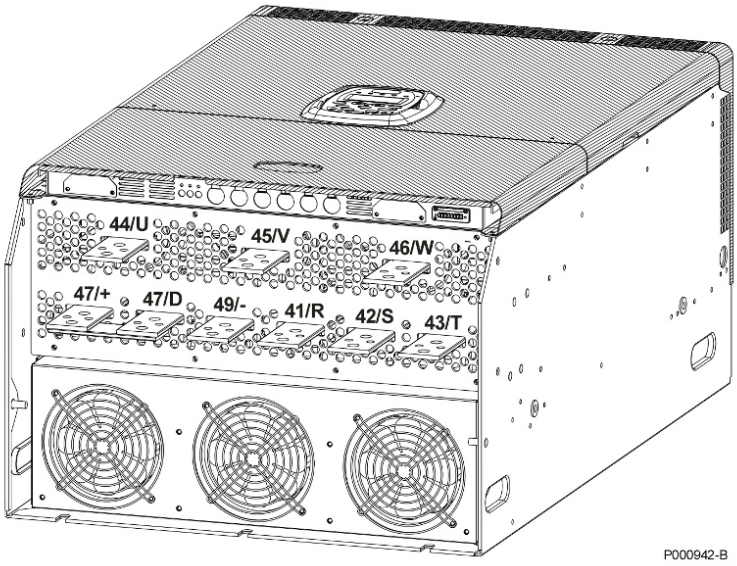


Figure 2: Connection bars in S41-S42-S51-S52

2.3.3. CONNECTION BARS FOR S60 INVERTERS

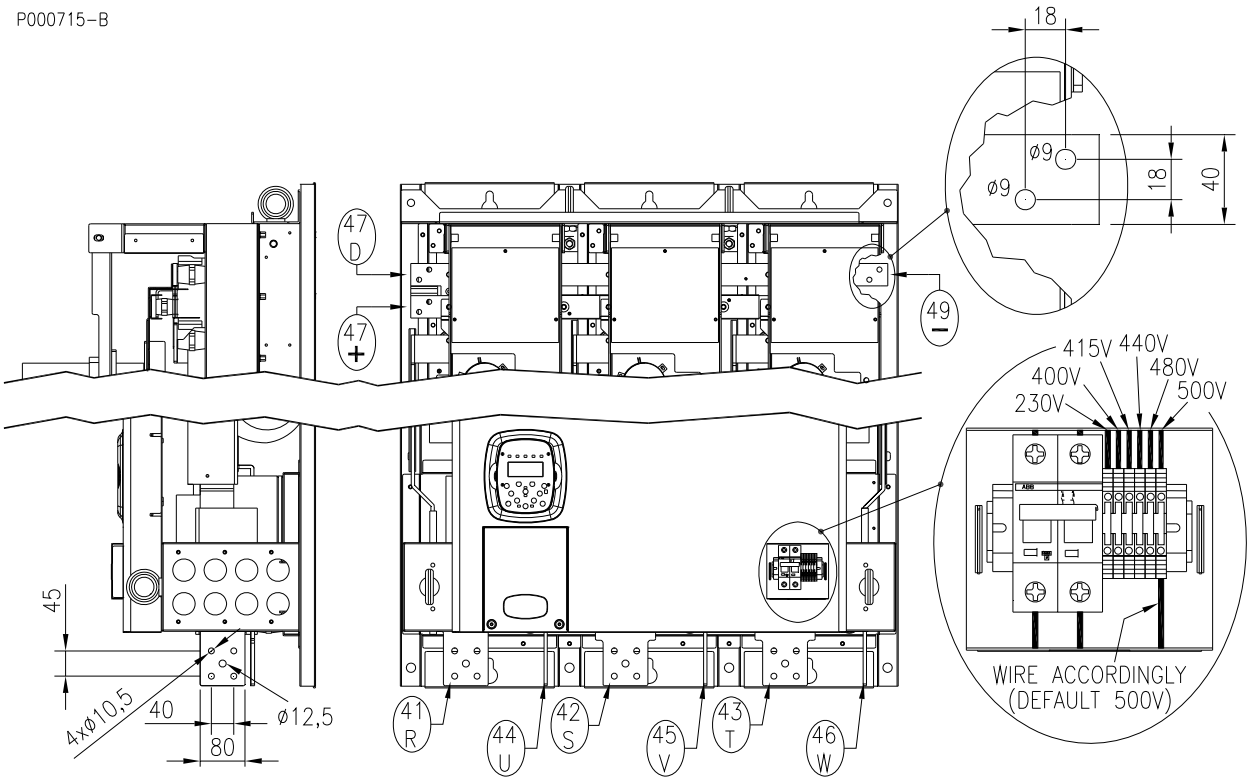


Figure 3: S60 Connection bars

Figure 3 shows the location and dimension of the bars connecting S60 iDrives to the mains and the motor. The figure also shows the position and the wiring instructions for the built-in power supply transformer. The transformer must be wired based on the rated supply voltage being used.

CAUTION Connection bars **47/D** and **47/+** are short-circuited as a factory setting. The DC choke, if any, shall be linked between bars **47/D** and **47/+** after removing the short-circuit.

CAUTION Please contact Lönne Scandinavia AS if a DC supply is to be applied to iDrive S60.

2.3.4. CROSS-SECTIONS OF THE POWER CABLES AND SIZES OF THE SAFETY DEVICES

2.3.4.1. 2T VOLTAGE CLASS

Size	iDrive Model	Inverter Rated Current	Cable Cross-section Fitting the Terminal	Cable Stripping	Tightening Torque	Cable Cross-section to Mains and Motor Side	Fast Fuses (700V) + Disc. Switch	Magnetic Circuit Breaker	AC1 Contactor
		A	mm^2 (AWG/kcmils)	mm	Nm	mm^2 (AWG/kcmils)	A	A	A
S05	12,5-1,8	12.5	0.5÷10 (20÷6AWG)	10	1.2-1.5	2.5 (12AWG)	16	16	25
	15-2,2	15		10	1.2-1.5		16	16	25
	17-3	17		10	1.2-1.5	4 (10AWG)	20	25	25
	19-3,7	19		10	1.2-1.5		20	25	25
	23-4	23		10	1.2-1.5		25	25	25
	27-4,5	27		10	1.2-1.5	8 (8AWG)	32	32	45
	30-5,5	30		10	1.2-1.5		50	50	45
S12	38—7,5	38	0.5÷25 (20÷4AWG)	18	2.5	10 (6AWG)	63	63	60
	51-11	51		18	2.5	16 (5AWG)	80	80	80
	65-15	65		18	2.5	25 (4AWG)	80	80	80
S15	65-15	72		15	2.5		100	100	100
	72-15	80	4÷25 (12÷4AWG)	15	2.5		125	100	100
S20	88-22	88	25÷50 (3÷1/0AWG)	24	6-8	35 (2AWG)	125	125	125
	103-25	103		24	6-8	50 (1/0AWG)	125	125	125
	120-30	120		24	6-8		160	160	145
	135-32	135		24	6-8		200	160	160
S30	180-45	180	35÷185 (2AWG÷ 350kcmils)	30	10	95 (4/0AWG)	250	200	250
	195-50	195		30	10	120 (250kcmils)	250	250	250
	215-55	215		30	10		315	400	275
	240-65	240		30	10		400	400	275
S41	300-75	300	Bus bar	-	30	185 (400kcmils)	350	400	400
	345-90	345	Bus bar	-	30	240 (500kcmils)	500	400	450
	375-110	375	Bus bar	-	30	2x120 (2x4/0AWG)	550	630	450
	425-132	425	Bus bar	-	30	2x120 (2x250kcmils)	630	630	500
S51	480-132	480	Bus bar	-	50	2x150 (2x300kcmils)	700	630	550
	550-160	550	Bus bar	-	50	2x185 (2x350kcmils)	800	800	600
	680-185	680	Bus bar	-	50	2x240 (2x500kcmils)	1000	800	700
S60	720-200	720	Bus bar	-	50	3x150 (3x300kcmils)	1000	800	800
	800-220	800	Bus bar	-	50	3x185 (3x350kcmils)	1000	1000	1000

CAUTION

Always use the correct cable cross-sections and activate the protective devices provided for the inverter. Failure to do so will cause the non-compliance to standard regulations of the system where the inverter is installed.

2.3.4.2. 4T VOLTAGE CLASS

Size	iDrive Model	Inverter Rated Current	Cable Cross-section Fitting the Terminal	Cable Stripping	Tightening Torque	Cable Cross-section to Mains and Motor Side	Fast Fuses (700V) + Disc. Switch	Magnetic Circuit Breaker	AC1 Contactor
		A	mm^2 (AWG/kcmils)	mm	Nm	mm^2 (AWG/kcmils)	A	A	A
S05	10,5-3	10.5	0.5÷10 (20÷6AWG)	10	1.2-1.5	2.5 (12AWG)	16	16	25
	12,5-4	12.5		10	1.2-1.5		16	16	25
	16,5-4,5	16.5		10	1.2-1.5	4 (10AWG)	25	25	25
	16,5-5,5	16.5		10	1.2-1.5		25	25	25
	16,5-7,5	16.5		10	1.2-1.5		32	32	30
S12	27-9,2	26	0.5÷10 (20÷6AWG	10	1.2-1.5	10 (6AWG)	40	40	45
	30-9,2	30		10	1.2-1.5		40	40	45
	30-11	30		10	1.2-1.5		40	40	45
	41-15	41		10	1.2-1.5		63	63	55
	41-18,5	41		10	1.2-1.5		63	63	60
	57-22	57	0.5÷25 (20÷4AWG	18	2.5	16 (5AWG)	100	100	100
	60-25	60		18	2.5	25 (4AWG)	100	100	100
S15	65-25	72	0.5÷25 (20÷4AWG)	15	2.5	25 (4AWG)	100	100	100
	72-25	80	4÷25 (12÷4AWG)	15	2.5		125	100	100
	80-30								
S20	88-37	88	25÷50 (3÷1/0 AWG)	24	6-8	35 (2AWG)	125	125	125
	103-45	103		24	6-8	50 (1/0AWG)	125	125	125
	120-50	120		24	6-8		160	160	145
	135-55	135		24	6-8		200	160	160
S30	180-75	180	35÷185 (2AWG÷ 350kcmils)	30	10	95 (4/0AWG)	250	200	250
	195-80	195		30	10	120 (250kcmils)	250	250	250
	215-90	215		30	10		315	400	275
	240-110	240		30	10		400	400	275
S41	300-132	300	Bus bar	-	30	185 (400kcmils)	350	400	400
	345-160	345	Bus bar	-	30	240 (500kcmils)	500	400	450
	375-185	375	Bus bar	-	30	2x120 (2x4/0AWG)	550	630	450
	425-220	425	Bus bar	-	30	2x120 (2x250kcmils)	630	630	500
S51	480-250	480	Bus bar	-	50	2x150 (2x300kcmils)	700	630	550
	550-280	550	Bus bar	-	50	2x185 (2x350kcmils)	800	800	600
	680-355	680	Bus bar	-	50	2x240 (2x500kcmils	1000	800	700
S60	720-315	720	Bus bar	-	50	3x150 (3x300kcmils)	1000	800	800
	800-355	800	Bus bar	-	50	3x185 (3x350kcmils)	1000	1000	1000

CAUTION Always use the correct cable cross-sections and activate the protective devices provided for the inverter. Failure to do so will cause the non-compliance to standard regulations of the system where the inverter is installed.

2.3.4.1. 5T AND 6T VOLTAGE CLASSES

Size	iiDrive model	Inverter Rated Current	Terminal Cross-section	Cable Stripping	Tightening Torque	Cable Cross-section to Mains and Motor Side	Fast Fuses (700V) + Disc. Switch	Magnetic Circuit Breaker	AC1 Contactor
		A	mm^2 (AWG or kcmils)	mm	Nm	mm^2 (AWG or kcmils)	A	A	A
S14 6T	**7-4**	7	0.5÷16 (20÷5AWG)	10	1.2-1.5	2.5 (12AWG)	16	16	25
	9-4	9		10	1.2-1.5		16	16	25
	11-7,5	11		10	1.2-1.5	4 (10AWG)	32	32	30
	13-7,5	13		10	1.2-1.5		32	32	30
	17-11	17		10	1.2-1.5		32	32	30
S14	**21-11**	21	0.5÷25 (20÷4 AWG)	18	2.5-4.5	10 (6AWG)	40	40	45
	25-15	25		18	2.5-4.5		40	40	45
	33-22	33		18	2.5-4.5		63	63	60
	40-22	40		18	2.5-4.5		63	63	60
	52-37	52		18	2.5-4.5	16 (5AWG)	100	100	100
S22	**60-37**	60	25÷50 (4÷1/0 AWG	20	2.5-5	35 (2 AWG)	100	100	100
	80-55	80		20	2.5-5		100	100	100
	85-55	85		20	2.5-5	50 (1/0AWG)	125	125	125
	105-75	100		20	2.5-5		125	125	125
S32	**125-90**	125	25÷95 (4÷4/0AWG)	30	15-20	70 (2/0AWG)	200	200	250
	150-110	150		30	15-20		200	200	250
	190-132	190	35÷150 (2/0AWG÷ 300kcmils)	30	15-20	120 (250kcmils)	315	400	275
	230-185	230		30	15-20		315	400	275
	265-200	265		30	15-20		400	400	400
S42	**290-220**	305	Bus bar	-	30	240 (500kcmils)	400	400	400
	330-250	330	Bus bar	-	30		450	400	450
	360-315	360	Bus bar	-	30	2x120 (2x250kcmils)	500	400	450
	400-355	400	Bus bar	-	30		630	630	500
S52	**450-400**	450	Bus bar	-	50	2x150 (2x300kcmils)	630	630	550
	500-450	500	Bus bar	-	50		700	630	550
	560-500	560	Bus bar	-	50	2x185 (2x350kcmils)	800	800	600
	640-560	640	Bus bar	-	50	2x240 (2x500kcmils)	900	800	700

CAUTION Always use the correct cable cross-sections and activate the protective devices provided for the inverter. Failure to do so will cause the non-compliance to standard regulations of the system where the inverter is installed.

NOTE In modular sizes S65-S90, each supply arm shall be protected by a separate fuse (see table above).

CAUTION Always use the correct cable cross-sections and activate the protective devices installed on the DC power supply line. Failure to do so will cause the non-compliance to standard regulations of the system where the inverter is installed.

2.3.5. INVERTER AND MOTOR EARTH CONNECTION

A bolted screw for the earthing of the inverter enclosure is located close to the power wiring terminals. The screw can be located by the symbol below:

Always earth the inverter to a state-of-the-art mains. To reduce disturbance and radiated interference to a minimum, connect the motor earthing conductor directly to the inverter following a parallel path to the motor supply cables.

DANGER

Always connect the inverter earthing terminal to the grid earthing using a conductor complying with the safety regulations in force (see table below).
Always connect the motor casing to the inverter earth to avoid dangerous voltage peaks and electrical shock hazard.
Always provide proper earthing of the inverter frame and the motor casing.

NOTE

To meet UL conformity requirements of the system where the inverter is installed, use a "UL R/C" or "UL Listed" lug to connect the inverter to the earthing system. Use a loop lug fitting the earth screw and having the same cross-section as the earth cable being used.

Protective earthing conductor cross-section (refer to EN 61800-5-1):

Cross-sectional area of phase conductors of the inverter (mm^2)	Minimum cross-sectional area of the corresponding protective earthing conductor (mm^2)
S ≤ 10	10 (*)
10 < S ≤ 16	S (*)
16 < S ≤ 35	16
35 < S	S/2

NOTE

The values in the table above are valid only if the protective earthing conductor is made of the same metal as the phase conductors.
If this is not so, the cross-sectional area of the protective earthing conductor shall be determined in a manner which produces a conductance equivalent to that which results from the application of the table above.

NOTE (*)

In any case a cross-section of the protective earthing conductor of at least 10 mm^2 Cu or 16 mm^2 Al is required to maintain safety in case of damage to or disconnection of the protective earthing conductor (refer to EN 61800-5-1 about Touch current).

3. USING THE DISPLAY/KEYPAD

3.1. Overview

This section covers navigation in the display/keypad.

For details about particular settings of the keypad (contrast, backlight, etc.), please refer to the section concerning the display/keypad in the iDrive **Installation Instructions** manual, whilst for details regarding custom navigation for the root page, the measures in the Keypad page and the Root page and the PID custom unit of measure, please refer to the DISPLAY/KEYPAD MENU in the iDrive **Programming Instructions** manual.

3.2. Menu Tree

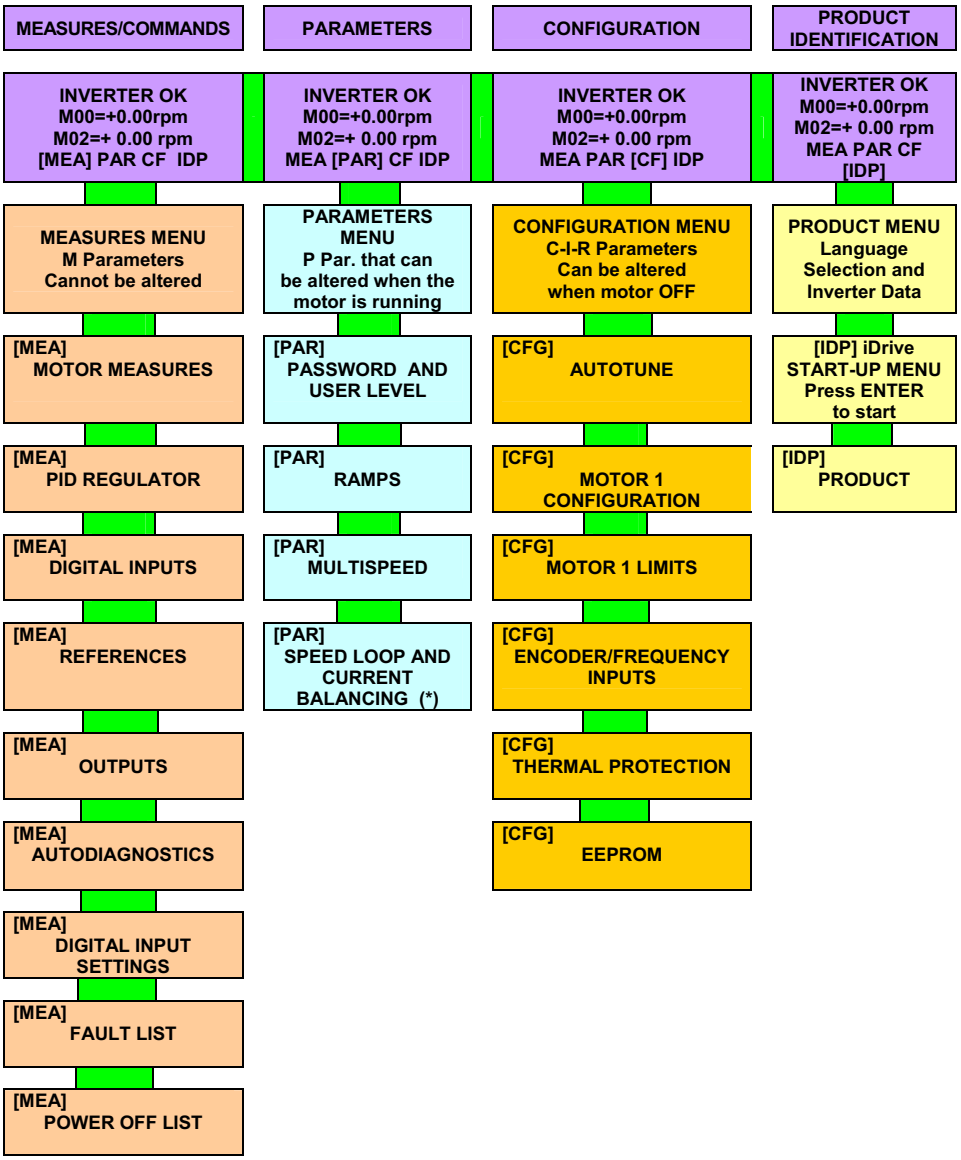
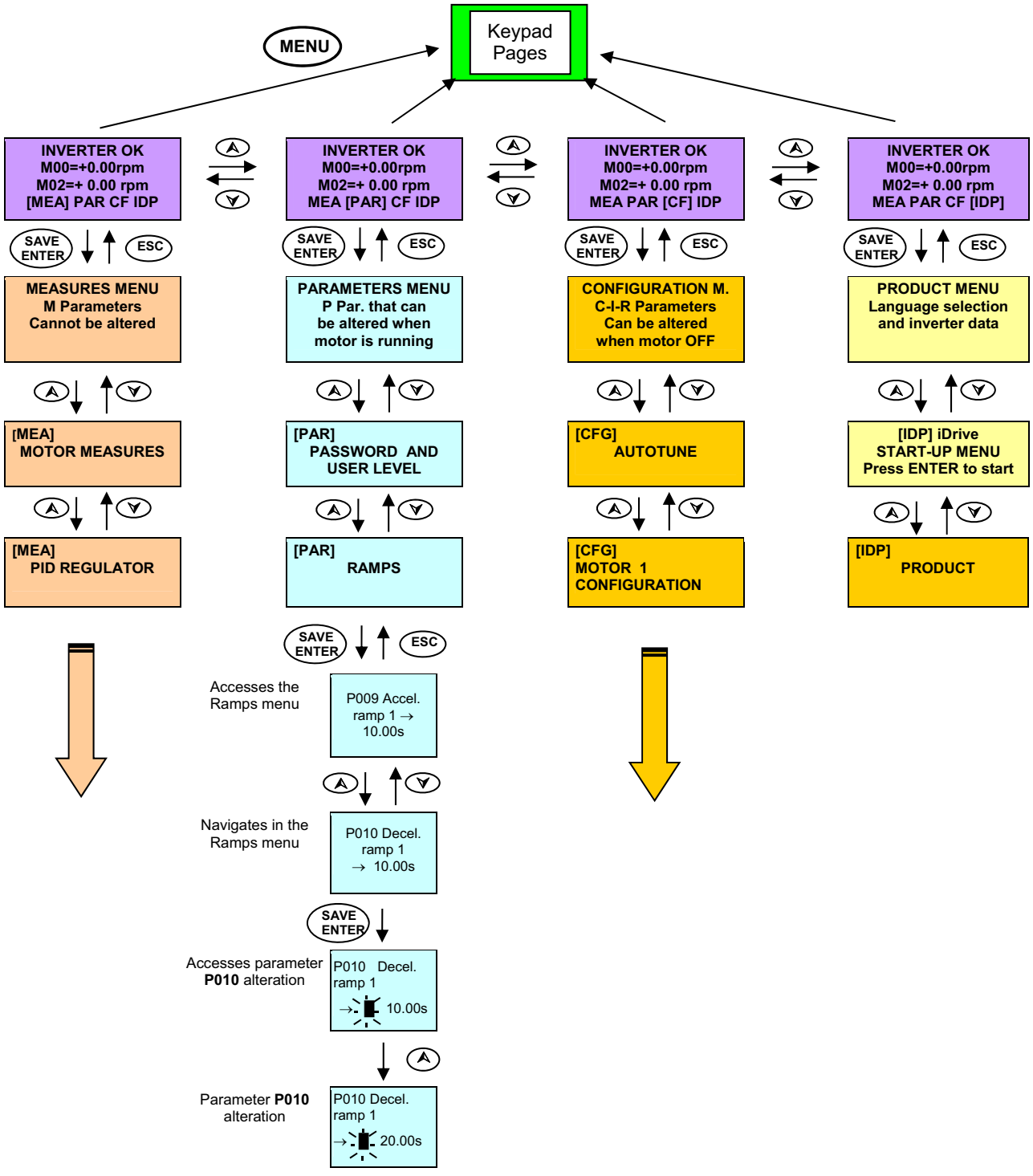

MEASURES/COMMANDS
PARAMETERS
CONFIGURATION
PRODUCT IDENTIFICATION
INVERTER OK M00=+0.00rpm M02=+ 0.00 rpm [MEA] PAR CF IDP
INVERTER OK M00=+0.00rpm M02=+ 0.00 rpm MEA [PAR] CF IDP
INVERTER OK M00=+0.00rpm M02=+ 0.00 rpm MEA PAR [CF] IDP
INVERTER OK M00=+0.00rpm M02=+ 0.00 rpm MEA PAR CF [IDP]
MEASURES MENU M Parameters Cannot be altered
PARAMETERS MENU P Par. that can be altered when the motor is running
CONFIGURATION MENU C-I-R Parameters Can be altered when motor OFF
PRODUCT MENU Language Selection and Inverter Data
[MEA] MOTOR MEASURES
[PAR] PASSWORD AND USER LEVEL
[CFG] AUTOTUNE
[IDP] iDrive START-UP MENU Press ENTER to start
[MEA] PID REGULATOR
[PAR] RAMPS
[CFG] MOTOR 1 CONFIGURATION
[IDP] PRODUCT
[MEA] DIGITAL INPUTS
[PAR] MULTISPEED
[CFG] MOTOR 1 LIMITS
[MEA] REFERENCES
[PAR] SPEED LOOP AND CURRENT BALANCING (*)
[CFG] ENCODER/FREQUENCY INPUTS
[MEA] OUTPUTS
[CFG] THERMAL PROTECTION
[MEA] AUTODIAGNOSTICS
[CFG] EEPROM
[MEA] DIGITAL INPUT SETTINGS
[MEA] FAULT LIST
[MEA] POWER OFF LIST

Figure 4: Menu Tree.

(*) Available for VTC and FOC controls only.

3.3. Navigation


MENU
Keypad Pages
INVERTER OK M00=+0.00rpm M02=+ 0.00 rpm [MEA] PAR CF IDP
INVERTER OK M00=+0.00rpm M02=+ 0.00 rpm MEA [PAR] CF IDP
INVERTER OK M00=+0.00rpm M02=+ 0.00 rpm MEA PAR [CF] IDP
INVERTER OK M00=+0.00rpm M02=+ 0.00 rpm MEA PAR CF [IDP]
SAVE ENTER
ESC
MEASURES MENU M Parameters Cannot be altered
PARAMETERS MENU P Par. that can be altered when motor is running
CONFIGURATION M. C-I-R Parameters Can be altered when motor OFF
PRODUCT MENU Language selection and inverter data
[MEA] MOTOR MEASURES
[PAR] PASSWORD AND USER LEVEL
[CFG] AUTOTUNE
[IDP] iDrive START-UP MENU Press ENTER to start
[MEA] PID REGULATOR
[PAR] RAMPS
[CFG] MOTOR 1 CONFIGURATION
[IDP] PRODUCT
Accesses the Ramps menu
P009 Accel. ramp 1 → 10.00s
Navigates in the Ramps menu
P010 Decel. ramp 1 → 10.00s
Accesses parameter P010 alteration
P010 Decel. ramp 1 10.00s
Parameter P010 alteration
P010 Decel. ramp 1 20.00s

If the **ESC** key is pressed to quit, the new parameter value will be acknowledged but not saved to non-volatile memory, and will therefore be lost at power off. Press **SAVE/ENTER** to confirm parameter alteration.

Figure 5: Navigation example.

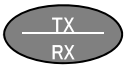
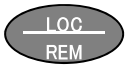
3.4. Function Keys

Press the **SAVE/ENTER** key for parameter alteration; when a flashing cursor appears, press ▲ and ▼ to change the parameter value. Do one of the following to quit the editing mode:

Press ESC → the parameter value used by the drive is altered and is maintained until the drive is shut off.

Press SAVE/ENTER → the parameter value is stored to non-volatile memory and is not deleted when the drive is shut off.

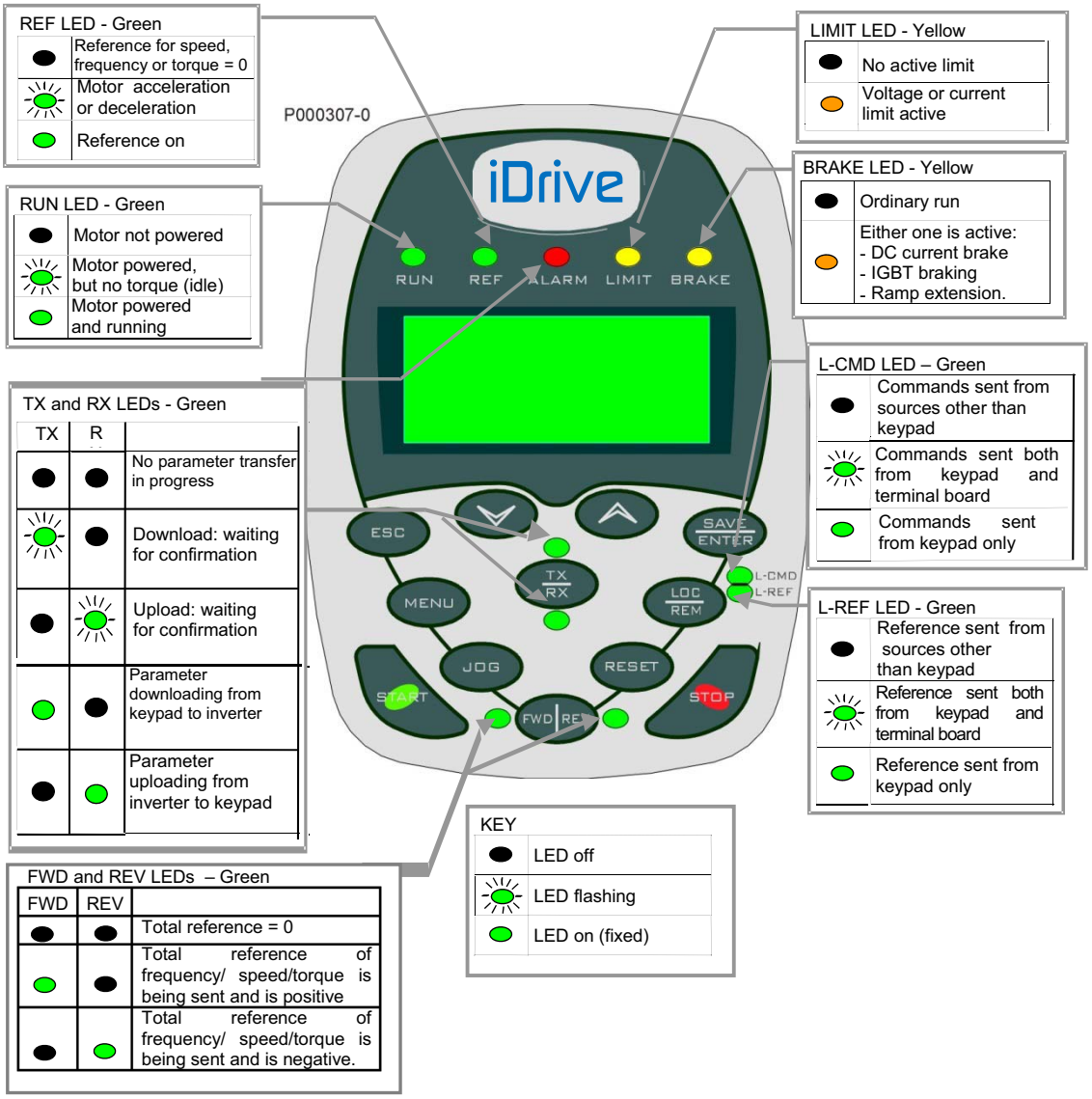
Input values (**Ixxx**) cannot be saved to non-volatile memory; inputs are automatically set to their default values.

Key	Functions
	Quits menus and sub-menus and confirms a new parameter value (when the editing mode is activated, the cursor starts flashing), which is not saved to non-volatile memory (the value is lost when the inverter is turned off). If the Operator mode is set up and the keypad is locked on the Keypad page, press ESC for at least 5 s to restart navigation.
	Down arrow; scrolls through the menus and submenus, the pages in a submenu or the parameters in descending order. While programming, it decrements the parameter value. Hold it down along with the increment key ^ to access the next menu.
	Up arrow; scrolls through the menus and submenus, the pages in a submenu or the parameters in ascending order. While programming, it increments the parameter value.
	Accesses menus and submenus. In programming mode (cursor flashing) this key saves to non-volatile memory (EEPROM) the value of the parameter being altered. This prevents any parameter modification from being cleared in case of mains loss. If pressed when the Keypad page is displayed, the SAVE/ENTER key allows displaying the “Keypad Help” page, where the variables viewed in the previous page are detailed.
	If pressed more than once, it scrolls through the menus: start page → access page for parameter alteration → ID SW page → keypad → start page, and so on.
	Enters the pages for the parameter DOWNLOAD from the keypad to the inverter (TX) or allows parameter UPLOAD from the inverter to the keypad (RX); if pressed more than once, the **TX|RX** key allows selecting either operating mode. The active selection is highlighted by the page displayed; the relevant TX or RX LED starts flashing. To confirm Upload/Download, press the Save/Enter key when the wanted selection is active.
	If pressed once, reference and commands are forced via keypad; press it again to return to the prior configuration or to change the active reference in the Keypad page depending on the preset type of Keypad page (see the Display menu in the iDrive’s Programming Instruction manual).
	Resets the alarm tripped once the cause responsible for the alarm has disappeared. Press it for 8 seconds to reset the control board, thus allowing the microprocessors to be reinitialized and to activate R parameters with no need to shut off the inverter.
	If enabled, it starts the motor (at least one of the command sources is represented by the keypad).
	If enabled, it stops the motor (at least one of the command sources is represented by the keypad).
	The Jog key is active only when at least one of the command sources is represented by the keypad; if depressed, it enters the Jog reference set in the relevant parameter.
	If enabled (at least one of the command sources is represented by the keypad), it reverses the sign of the overall reference. Press this key again to change the reference sign.

3.5. Indicator LEDs in the Display/Keypad

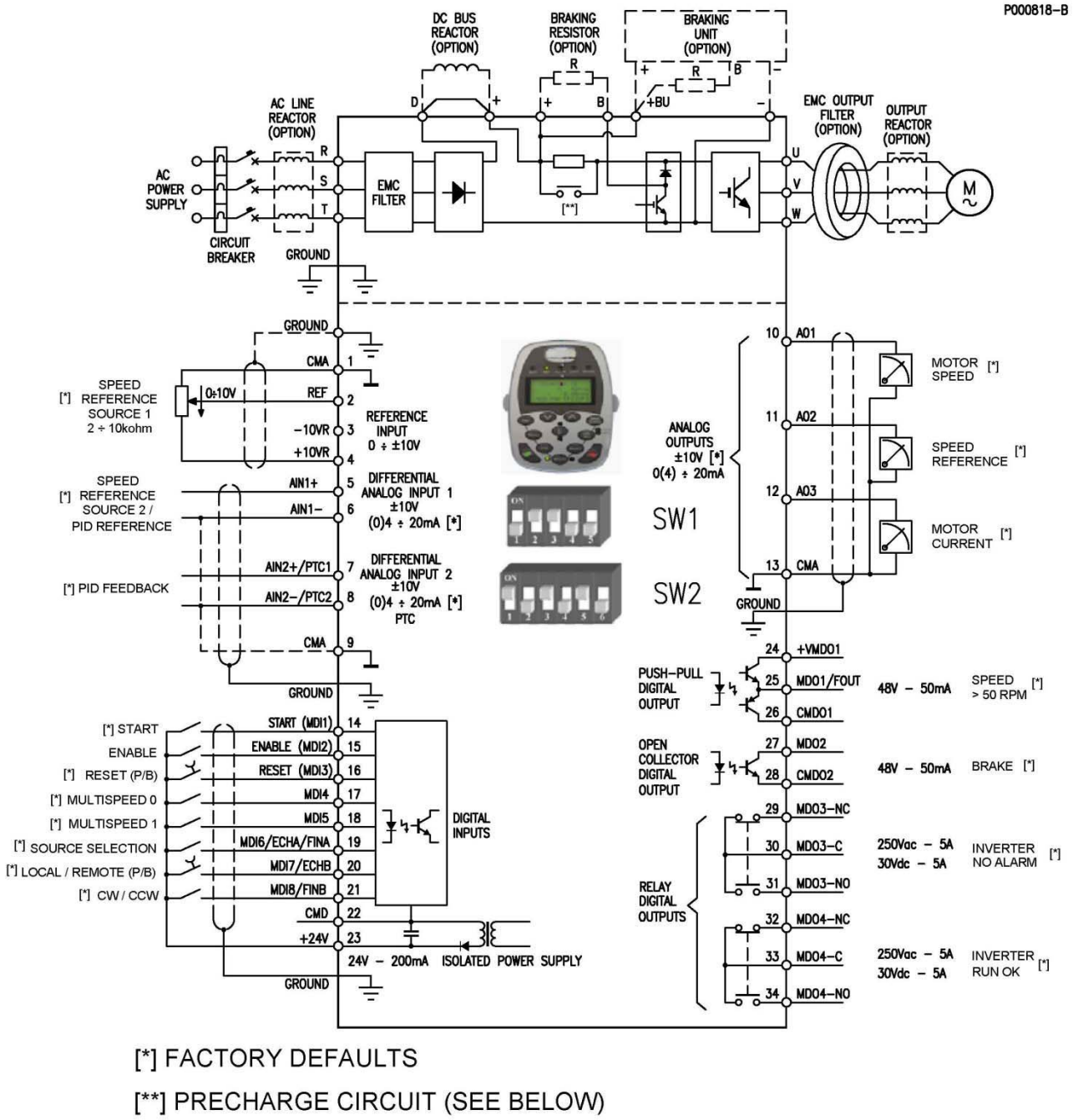
Eleven LEDs are located on the keypad, along with a 4-line, 16-character LCD display, a buzzer and 12 function keys. The display shows parameter values, diagnostic messages and the variables processed by the iDrive.

The figure below shows the location of the signal LEDs and their functionality.



4.WIRING

4.1. Wiring Diagram



[*] FACTORY DEFAULTS

[**] PRECHARGE CIRCUIT (SEE BELOW)

Figure 6: Wiring Diagram.

[**] CAUTION

Please contact Lönne Scandinavia AS if DC current is to be supplied to iDrive S41, S42, S51, S52, S60, S64, S74, S84, as no precharge circuit in the DC-bus capacitors is provided.

CAUTION

In case of fuse line protection, always install the fuse failure detection device, that disables the drive, to avoid single-phase operation of the equipment.

NOTE

The wiring diagram relates to factory-setting. Please refer to the Power Terminals / Bars.

NOTE

See the REACTORS section in the standard iDrive **Installation Instructions** manual for any information on accessories and optional reactors. When ordering iDrive S15, S20 and S30, please state if reactors are to be installed on the equipment.

[*]
NOTE

Factory settings can be changed by changing the configuration of the DIP switches and/or by changing the parameters pertaining to the terminals concerned (see iDrive **Programming Instructions** manual).

CAUTION

When no DC reactor is used, terminals **D** and **+** must be short-circuited (factory setting).

CAUTION

For S60 inverters only: if the supply voltage is other than 500Vac, the wiring of the internal auxiliary transformer must be changed accordingly.

5. ALARMS AND WARNINGS

CAUTION If a protection trips or the drive enters the emergency mode, the drive is locked and the motor idles!

5.1. What Happens when a Protective Device Trips

NOTE Before operating the drive in emergency conditions, carefully read this section and the following section, **What To Do When an Alarm Trips**.

The drive alarms are detailed below.

When a protection / alarm trips:

1) the **ALARM** LED on the keypad comes on;
2) the page displayed on the keypad is the root page of the **FAULT LIST**;
3) the **FAULT LIST** is refreshed;

In factory-setting, when the drive is switched on after an alarm has tripped—which has not been reset—it is kept in emergency condition.
If the drive is in emergency mode when switched on, this could be due to an alarm tripped before the drive was reset.
To avoid storing the alarms tripped before the drive is switched off, set parameter **C257** in the **Autoreset Menu**.
The drive stores the moment when an alarm trips to the **FAULT LIST** (supply time and operation time). The drive status when the alarm tripped and some measures sampled when the alarm tripped are also stored to the Fault List.
The readout and storage of the fault list can be very useful to detect the cause responsible for the alarm and its possible solution (see also the Fault List Menu/Power Off List Menu in the iDrive **Programming Instructions** manual).

NOTE Alarms **A001** to **A039** relate to the main microcontroller (DSP Motorola) of the control board, which detected a fault on the control board itself. No fault list is available for Alarms **A001** to **A039** and no Reset command can be sent via serial link; alarms can be reset through the **RESET** terminal on the terminal board or the **RESET** key on the keypad. No software for the keypad interface is available; the drive parameters and measures cannot be accessed via serial link.
Avoid resetting alarms **A033** and **A039**, as they trip when the flash memory is not provided with its correct software. Alarms **A033** and **A039** can be reset only when proper software is downloaded for the drive flash memory.

CAUTION Before resetting any alarm, deactivate the **ENABLE** signal on terminal **MDI2** to disable the drive and prevent the connected motor from running at uncontrolled speed.

5.2. What To Do when an Alarm Trips

CAUTION Before resetting any alarm, disable the **ENABLE** signal on terminal **MDI2** to disable the drive and to prevent the connected motor from running at uncontrolled speed.

Proceed as follows:

1. Disable the **ENABLE** signal on terminal **MDI2** to disable the drive and to lock the motor, unless parameter **C181**=1 (the Safety Start function is active): after resetting an alarm or after supplying the drive, this will start only if the **ENABLE** contact is open and closed.
2. If the motor is idling, wait until it stops.

Check the **FAULT LIST** carefully for any information about the alarm tripped, in order to find the cause responsible for the alarm and its possible solutions.
Any information stored to the FAULT LIST is also required when contacting Lönne Scandinavia AS's Customer Service.

3. In the following sections, find the alarm code and follow the instructions given.
4. Solve any external problems that may have been responsible for the protection trip.
5. If the alarm tripped due to the entry of wrong parameter values, set new correct values and save them.
6. Reset the alarm.
7. If the alarm condition persists, please contact Lönne Scandinavia's Customer Service.

A **RESET** command must be sent to reset the alarms tripped. Do one of the following:

- Enable the **RESET** signal in **MDI3** terminal in the hardware terminal board;
- Press the **RESET** key on the keypad.

5.3. Alarm Code List

Alarm	Alarm Message	Description	What to do
A001 ÷ A032 A034 ÷ A038	…	*Control board failure*	*1. Reset the iDrive.* *2. Contact Lönne Scandinavia's Customer Service.*
A033	TEXAS VER KO	Incompatible Texas Software Version	1. Download the correct DSP Texas software version. 2. Contact Lönne Scandinavia's Customer Service.
A039	FLASH KO	Texas Flash not progr.	
A040	User Fault	Alarm caused by the user	Reset the iDrive.
A041	PWMA Fault	General hardware fault from IGBT, side A	1. Reset the iDrive. 2. Contact Lönne Scandinavia's Customer Service.
A042	Illegal XMDI in DGI	Illegal configuration of XMDI in the Digital Inputs menu	1. Check setting in **R023**. 2. Check settings in the Digital Inputs menu.
A043	…	*Control board failure*	*1. Reset the iDrive.* *2. Contact Lönne Scandinavia's Customer Service.*
A044	SW OverCurrent	Software overcurrent	1. Check drive and motor ratings. 2. Check output short circuit. 3. Check for disturbance in control signal. 4. Set a longer acceleration time. 5. Set a longer deceleration time. 6. Disconnect motor and change **C010** to 0:IFD.
A045	Bypass Circuit Fault	Precharge By-Pass fault	1. Reset the iDrive. 2. Contact Lönne Scandinavia's Customer Service.
A046	Bypass Con. Fault	Precharge By-Pass connector fault	
A047	UnderVoltage	DC bus voltage lower than Vdc_min	1. Check supply voltage on terminals R, S, T. 2. Check **M030** (Supply voltage) and **M029** (DC bus voltage). 3. Check **M030** and **M029** in the Fault List. 4. Contact Lönne Scandinavia's Customer Service.
A048	OverVoltage	DC bus voltage exceeding Vdc_max	1. Check supply voltage on terminals R, S, T. 2. Check **M030** (Supply voltage) and **M029** (DC bus voltage). 3. Check **M030** and **M029** in the Fault List. 4. Set a longer deceleration time. 5. Add dynamic brake resistor. 6. Contact Lönne Scandinavia's Customer Service.
A049	…	*Control board failure*	*1. Reset the iDrive.* *2. Contact Lönne Scandinavia's Customer Service.*
A050	PWMA0 Fault	Hardware Fault from IGBT converter, side A	1. Reset the iDrive. 2. Contact Lönne Scandinavia's Customer Service.
A051	PWMA1 Fault	Hardware overcurrent, side A	1. Check drive and motor ratings. 2. Check output short circuit. 3. Check disturbance in control signal. 4. Set a longer acceleration time. 5. Set a longer deceleration time. 6. Disconnect motor and change **C010** to 0:IFD.
A052	Illegal XMDI in DGO	Illegal configuration of XMDI in the Digital Outputs menu	1. Check setting in **R023**. 2. Check settings in the Digital Outputs menu.
A053	PWMA Not ON	Hardware failure, IGBT A power on impossible	1. Reset the iDrive. 2. Contact Lönne Scandinavia's Customer Service.
A054	Option Board not in	Failure in detecting preset option I/O board	1. Check consistency of parameter **R023.** 2. Contact Lönne Scandinavia's Customer Service.
A055	PTC Alarm	External PTC tripped	1. Allow motor to cool. 2. Ensure that PTC is correctly connected to AIN2. 3. Ensure that SW1 is correctly set up in the control board.

Alarm	Alarm Message	Description	What to do
A056	PTC Short Circuit	External PTC in short circuit	1. Make sure that the PTC is correctly connected to **AIN2**. 2. Ensure that SW1 is correctly set up in the control board.
A057	Illegal XMDI in MPL	Illegal configuration of XMDI in the Virtual Digital Outputs menu	1. Check setting in **R023**. 2. Check setting in the MPL menu.
A059	Encoder Fault	Error of motor speed measure	1. Check if encoder parameters are correct. 2. Check if encoders are properly connected and mounted. 3. Check if encoder signals are correct.
A060	NoCurrent Fault	Current is zero in FOC control	1. Check motor connections U, V, W. 2. Check FOC regulator menu setting (**Engineering** user level required). 3. Perform a new current regulator autotune. 4. Contact Lönne Scandinavia's Customer Service.
A061	Ser WatchDog	Watchdog tripped in serial link 0 (9-pole D connector)	1. Check serial link 0. 2. Make sure that the master sends read/write queries with max. interval between queries lower than preset watchdog operation time. 3. Set longer watchdog operation time (**R005**).
A062	SR1 WatchDog	Watchdog tripped in serial link 1 (RJ45)	1. Check serial link 1. 2. Make sure that the master sends read/write queries with max. interval between queries lower than preset watchdog operation time. 3. Set a longer watchdog operation time (**R012**).
A063	…	*Control board failure*	*1. Reset the iDrive.* *2. Contact Lönne Scandinavia's Customer Service.*
A064	Mains Loss	No power is supplied from the mains	1. Check supply voltage on terminals R, S, T. 2. Check **M030** (Supply voltage). 3. Check **M030** in the Fault List. 4. Alarm may be disabled or delayed in Power down menu (**Engineering** user level required).
A065	AutoTune Fault	Autotune failed	1. Reset the iDrive. 2. Check parameters in Motor Control Menu and perform a new autotune. 3. Contact Lönne Scandinavia's Customer Service.
A066	REF < 4mA	REF Current input (4÷20mA) lower than 4mA	1. Check setting of SW1 in the control board. 2. Check if signal cable is properly connected. 3. Check the current signal source.
A067	AIN1 < 4mA	AIN1 Current input (4÷20mA) lower than 4mA	
A068	AIN2 < 4mA	AIN2 Current input (4÷20mA) lower than 4mA	
A069	XAIN5 < 4mA	XAIN5 Current input (4÷20mA) lower than 4mA	1. Check if signal cable is properly connected. 2. Check the current signal source.
A070	Fbs WatchDog	Fieldbus Watchdog tripped	1. Check fieldbus connection. 2. Ensure master sends legal messages with max. time interval lower than preset watchdog time. 3. Set longer watchdog times (**R016**)
A071	…	*Control board failure*	*1. Reset the iDrive.* *2. Contact Lönne Scandinavia's Customer Service.*
A072	Parm Lost Chk	Parameter download/upload error	1. Check keypad connection. 2. Reset the alarm and repeat Upload/Download.
A073	Parm Lost 1 COM	Parameter download/upload error	
Alarm	**Alarm Message**	**Description**	**What to do**
A074	Inverter Overheated	Drive thermal protection tripped	1. Check drive output current (**M026**) during normal operation. 2. Check mechanical load of connected motor (locked shaft/overload).
A075	Motor Overheated	Motor thermal protection tripped	1. Check mechanical conditions and load. 2. Check parameters **C265** and **C267**.

A076	Speed Alarm	Motor speed too high	1. Check if **C031** is compatible with the connected motor. 2. Check the torque reference in Slave mode (**Advanced** user level required).
A078	…	*Control board failure*	*1. Reset the iDrive.* *2. Contact Lönne Scandinavia's Customer Service.*
A079	FOC No Encoder	FOC control but Encoder not enabled	Set correct encoder parameters for FOC control.
A080	Tracking Error	Encoder speed tracking error	1. Set param. **C192**, **C193** correctly. 2. Check torque limit value. 3. Check mechanical load. 4. Check encoder operation (**Engineering** user level required).
A081	KeyPad WatchDog	Communication watchdog via keypad	1. Check keypad connection. 2. Check settings for RJ45 serial link.
A082	Illegal Encoder Cfg	Functions programmed for MDI6 and MDI7 or Encoder B selected but no encoder board detected	1. Check setting of **C189**. 2. Check settings for MDI6 and MDI7. 3. Check encoder board, if used (**Advanced** user level required).
A083	External Alarm 1	External alarm 1	Check external signal in allocated MDI.
A084	External Alarm 2	External alarm 2	
A085	External Alarm 3	External alarm 3	
A086	XAIN5 > 20mA	XAIN5 Current input (4÷20mA or 0÷20mA) greater than 20mA	1. Check if signal cable is properly connected. 2. Check the current signal source.
A088	…	*Control board failure*	*1. Reset the iDrive.* *2. Contact Lönne Scandinavia's Customer Service.*
A089	Parm Lost 2 COM	Parameter download/upload error	1. Check keypad connection. 2. Reset the alarm and repeat Upload/Download.
A090	Parm Lost 3 COM	Parameter download/upload error	
A091	Braking Resistor Overload	Overvoltage with braking resistance enabled due to continuous operation longer than the time set in **C211**	1. Resest the iDrive. 2. Increase resistor rating and settings for **C211**-**C212** (**Engineering** user level required).
A092	…	*Control board failure*	*1. Reset the iDrive.* *2. Contact Lönne Scandinavia's Customer Service.*
A093	Bypass Circuit Open	By-Pass relay open	1. Reset the iDrive. 2. Contact Lönne Scandinavia's Customer Service.
A094	Heatsink Overheated	IGBT heatsink temperature too high	1. Check ambient temperature. 2. Check motor current. 3. Decrease carrier frequency (**C001**-**C002**). (**Engineering** user level required).
A095	Illegal Drive Profile Board	Incorrect configuration of Drive Profile board	1. Make sure that the Drive Profile board is correctly configured for the iDrive iDrive. 2. Replace the Drive Profile board.
A096	Fan Fault	Fault of the cooling fans	Replace fans.
A097	Motor Not Connected	Motor not wired	1. Check connections to U, V, W. 2. Check motor parameters & perform new autotune for VTC & FOC.
A098	Illegal Motor Selected	Illegal motor selected via MDI	1. Check setting in **C009**. 2. Check **C173**-**C174** and MDI status (**Engineering** level required).

Alarm	Alarm Message	Description	What to do
A099	2nd Sensor Fault	Fault of fan sensor 2	1. Reset the iDrive. 2. Contact Lönne Scandinavia's Customer Service.
A100	MDI6 Illegal Configuration	Function programmed for MDI6 along with frequency input A	Check configuration of **MDI6** and setting in **C189**.
A101	MDI8 Illegal Configuration	Function programmed for MDI8 along with frequency input B	
A102	REF>20mA	REF Current input (4÷20mA or 0÷20mA) greater than 20mA	1. Check setting of SW1 in the control board. 2. Check the current signal source.
A103	AIN1>20mA	AIN1 Current input (4÷20mA or 0÷20mA) greater than 20mA	
A104	AIN2>20mA	AIN2 Current input (4÷20mA or 0÷20mA) greater than 20mA	
A105	PT100 Channel 1 Fault	Hardware address out of measure range of the drive	1. Check setting of SW1 in ES847 (optional board). 2. Check the current signal source.
A106	PT100 Channel 2 Fault	Hardware address out of measure range of the drive	
A107	PT100 Channel 3 Fault	Hardware address out of measure range of the drive	
A108	PT100 Channel 4 Fault	Hardware address out of measure range of the drive	
A109	Amb.Overtemp.	Ambient overtemperature	1. Open the cabinet and check its conditions. Also check measure **M062**. 2. Reset the iDrive. 3. Contact Lönne Scandinavia's Customer Service.
A110 ÷ A127	…	*Control board failure*	*1. Reset the iDrive.* *2. Contact Lönne Scandinavia's Customer Service.*

Table 1: Alarm Code List.

5.4. Warnings

Warning messages are displayed on the display/keypad. They are flashing messages that usually appear in line 1 or 2 on the display.

NOTE Warnings are neither protections nor alarms, and are not stored to the Fault list.

Warning	Message	Description
W03	SEARCHING…	The user interface is searching the data of the next page to display.
W04	DATA READ KO	Software warnings concerning data **reading**.
W06	HOME SAVED	The page displayed has been saved as the home page displayed at power on.
W07	DOWNLOADING	The keypad is **writing** to the drive the WORK zone parameters saved to its own flash memory.
W08	UPLOADING	The keypad is **reading** from the drive the WORK zone parameters that will be saved to its own flash memory.
W09	DOWNLOAD OK	Parameters were successfully downloaded (**written**) from the keypad to the drive.
W11	UPLOAD OK	Parameters were successfully uploaded (**read**) from the drive to the keypad.
W12	UPLOAD KO	The keypad interrupted parameter upload to the drive. Parameter **reading** has failed.
W13	NO DOWNLOAD	A Download procedure was queried, but no parameter is saved to the flash memory.
W16	PLEASE WAIT…	Wait until the system completes the operation required.
W17	SAVE IMPOSSIBLE	Parameter save is not allowed.
W18	PARAMETERS LOST	The keypad interrupted parameter download to the drive. Parameter **writing** has failed. As a result, not all parameters have been updated (parameter inconsistency).
W19	NO PARAMETERS LOAD	UPLOAD impossible.
W20	NOT NOW	The required function is not available at the moment.
W21	CONTROL ON	The required function is inhibited because the drive is running.
W23	DOWNLOAD VER. KO	Download failed because parameters saved to keypad memory relate to a SW version or product ID incompatible with the drive SW version or product ID.
W24	VERIFY DATA	Download preliminary operation underway, the system is checking the integrity and compatibility of the parameters saved in the keypad memory.
W28	OPEN START	Open and close the **START** (MDI1) signal to start the drive.
W31	ENCODER OK	Encoder tuning procedure finished: the encoder is correctly connected.
W32	OPEN ENABLE	Open and close the **ENABLE** (MDI2) signal to enable the drive.
W33	WRITE IMPOSSIBLE	Writing procedure impossible.
W34	ILLEGAL DATA	Illegal value entered, operation failed.
W35	NO WRITE CONTROL	Writing procedure impossible because Control is active and the drive is running.
W36	ILLEGAL ADDRESS	Illegal address entered, operation failed.
W37	ENABLE LOCKED	The drive is disabled and does not acknowledge the **ENABLE** command because it is writing a “C” parameter. **CAUTION The drive will start up as soon as writing is over!!!**
W38	LOCKED	Editing mode cannot be accessed because parameter modification is disabled: **P000** is different from **P002**.

Warning	Message	Description
W39	KEYPAD DISABLED	The editing mode cannot be accessed because the keypad is disabled.
W40	FAN FAULT	Fan locked or disconnected or faulty.
W41	SW VERSION KO	Download impossible because of different SW Versions.
W42	IDP KO	Download impossible because of different IDPs (Identification Products).
W43	PIN KO	Download impossible because of different PINs (Part Identification Numbers).
W44	CURRENT CLASS KO	Download impossible because of different current classes.
W45	VOLTAGE CLASS KO	Download impossible because of different voltage classes.
W46	DOWNLOAD KO	Download impossible (generic cause).
W48	OT Time over	The preset threshold for the drive Operation Time has been exceeded.
W49	ST Time over	The preset threshold for the drive Supply Time has been exceeded.
W50	NTC Fault	NTC sensor for heatsink temperature disconnected or faulty

Table 2: Warning list.

5.5. State List

Number	State	Description
0	ALARM!!!	Alarm tripped
1	START UP	The drive is starting up
2	MAINS LOSS	Mains loss
3	TUNING	The drive is tuning
4	SPEED SEARCHING	Searching for motor speed
5	DCB at START	DC Braking at start
6	DCB at STOP	DC Braking at stop
7	DCB HOLDING	DC current for Hold function
8	DCB MANUAL	Manual DC Braking
9	LIMIT IN ACCEL.	Current/torque limit while accelerating
10	LIMIT IN DECEL.	Current/torque limit while decelerating
11	LIMIT IN CONSTANT RPM	Current/torque limit at constant rpm
12	BRAKING	Braking module startup or deceleration ramp extension
13	CONSTANT RUN	Drive running at speed set point
14	IN ACCELERATION	Drive running with motor in acceleration stage
15	IN DECELERATION	Drive running with motor in deceleration stage
16	INVERTER OK	Drive on Stand-by with no alarms tripped
17	FLUXING	Motor fluxing stage
18	MOTOR FLUXED	Motor fluxed
19	FIRE MODE RUN	Constant rpm in Fire Mode
20	FIRE MODE ACCEL.	Acceleration in Fire Mode
21	FIRE MODE DECEL.	Deceleration in Fire Mode
22	INVERTER OK*	Drive on Stand-by with no alarms tripped, but void warranty due to alarm trip in Fire Mode
25	SPARE	Board in Spare mode
27	WAIT NO ENABLE	Waiting for **ENABLE** command opening
28	WAIT NO START	Waiting for **START** command opening
29	PIDOUT min DISAB	Drive disabled due to PID output < Min.
30	REF min DISAB.	Drive disabled due to REF < Min.
31	IFD WAIT REF.	Drive enabled with IFD control waiting for reference in order to start
32	IFD WAIT START	Drive enabled with IFD control waiting for START in order to start
33	DISABLE NO START	When fluxing, the RUN command was not given within the max. time set in **C183**. The drive is kept disabled until the RUN command is given.

Table 3: State List.

LÖNNE
DRIVE TECHNOLOGY

	Adress	Telephone/ Fax	Service Telephone
Norway			
Lönne Scandinavia AS Bergen **Head office Lönne group** **Sales office** **Engineering Department Purchase Department** **Local Warehouse**	**Liamyrane 12 N-5132** **Bergen PO-Box 160-Nyborg** **N-5871 Bergen** **info.norway@lonne.com**	**Telephone** **(+47) 55 39 10 00** **Telefax** **(+47) 55 39 11 00**	**24H Telephone Service** **(+47) 91 83 30 73**
Lönne Scandinavia AS Oslo **Sales Office**	**Frysjaveien 40 N-0884 Oslo** **PO-Box 165 Kjelsås N - 0411**	**Telephone** **(+47) 22 02 10 30** **Telefax** **(+47) 22 02 10 50**	
Lönne Scandinavia AS Ålesund **Sales Office**	**Åregjerdet 9A N-6018** **Ålesund**	**Telephone** **(+47) 10 15 39 00** **(+47) 91 15 63 66** **Telefax** **(+47) 10 15 39 01**	
Sweden			
Lönne Scandinavia AB Hälsingborg **Sales Office** **Central Warehouse** **Central Workshop&Testfield**	**Kastellgatan 5 S-25466** **Hälsingborg** **info.sweden@lonne.com**	**Telephone** **(+46) (0) 42 38 03 00** **Telefax** **+46 (0) 42 38 03 09**	**24H Telephone Service** **(+46) (0) 70 88 55 431**
Lönne Scandinavia AB Malmö **Sales Office**	**Flygaregatan 4 S-21239** **Malmø**	**Telephone** **(+46) (0) 42 38 03 00** **Telefax** **(+46) (0) 42 38 03 09**	
Denmark			
Lönne Scandinavia AS **Sales Office**	**Cedervej 2** **DK-8462 Harlev J** **info.denmark@lonne.com**	**Telephone** **(+45) 76 40 87 00** **Telefax** **(+45)76 40 87 01**	**24H Telephone Service** **(+45) 24 45 74 03**
Finland			
Lönne Scandinavia OY Sales Office	**Hernepellontie 11 FI-00710** **Helsinki**	**Telephone** **(+358) (0) 9 342 4300** **Telefax** **(+358 (0) 9 3424 3099**	**24H Telephone Service** **(+358) (0) 40 5208 729**